IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reissue Application of: **Pinkham**	Group Art Unit: **To Be Assigned**
Patent No.: **5,906,223**	Examiner: **To Be Assigned**
For: **Chromatography Valve Assembly**	Date: **August 15, 2001**
Reissue Application No.: **To Be Assigned**	
Filing Date: **To Be Assigned**	

Assistant Commissioner of Patents
Washington, DC 20231

PRELIMINARY AMENDMENT

Dear Sir:

Prior to examination of the above-captioned application, please amend the same as follows:

IN THE SPECIFICATION

Please replace the last paragraph starting at line 46 of column 1 with the following paragraph:

Fluid can flow through the prior art valve assembly 10 depicted in FIG. 1A in any one of the three directions depicted in FIGS. 1B-1D. The fluid flow is represented by arrows 25 in these figures. In FIG. 1B, which represents the forward product flow through the column, valve 14*a* is opened allowing the fluid to flow from the process piping into the valve assembly 10. Valve 16*a* is also opened allowing the fluid to flow into the chromatography column (not shown). The fluid returns from the chromatography column passing through valve 16*b* and reentering the valve assembly. The fluid leaves the valve assembly passing through valve 14*b* on its path back to the

process piping. Valves 12*a* and 12*b* remain closed during this process. According to the reverse process flow depicted in FIG. 1C, fluid entering the valve assembly 10 from the process piping can flow through valves 12*a* and 16*b* into the column, returning from the column through valve 16*a*, and exiting the valve assembly through valve 12*b* back through the process piping. Valves 14*a* and 14*b* remain closed during this process. The column may be bypassed altogether according to the process flow depicted in FIG. 1D, where the liquid entering into the valve assembly from the process piping encounters opened valves 12*a*, 14*a*, 12*b* and 14*b*, exiting the valve assembly without entering the chromatography column which remains inaccessible by closing valves 16*a* and 16*b*.

Please replace the fifth full paragraph of column 3 starting at line 20 with the following paragraph:

FIG. 3B is an enlarged cross-sectional view through line 3B-3B of FIG. 3A;

Please replace the first full paragraph of column 4 starting at line 6 with the following paragraph:

Referring now to FIG. 3A, there is shown a top view of the valve assembly, minus the manual bonnets and with a partial cross-sectional view of the underlying channel network drawn in with broken lines. As can be seen in this figure, ports 50, 52, 54 and 56 are arranged at angles of approximately 90° with respect to each other on opposing ends of the octagonal base section of the valve assembly. Each port opens into a chamber in the valve assembly 30–port 50 opening into chamber 60, port 52 opening into chamber 62, port 54 opening into chamber 64, and port 56

opening into chamber 66. Fluid entering any of the ports encounters a chamber and channels leading to at least two diverter valves. Fluid entering port 52, for example, encounters chamber 62 and channels leading to diverter valves 70 and 72. Fluid entering port 50, for example, encounters chamber 60 and channels leading to diverter valves 70, 76 and 78. The smooth and tortuous network of passageways that lead through the valve assembly connect the ports with the chambers and valves in a such a way that the valve assembly is fully drainable as will be later explained. The flow of the fluid is controlled by the diverter valves 70, 72, 74, 76, 78 and may be adjusted to permit specific flow directions which, in combination with the smooth and tortuous passageways, eliminate dead-legs from the system.

Please replace the second full paragraph of column 4 starting at line 28 with the following paragraph:

Referring now to FIG. 3B, there is shown an enlarged cross-sectional view of the valve assembly through line 3B-3B of FIG. 3A. As can be seen in the figure, port 50 opens into chamber 60. A passageway 55 leading to diverter valve 76 can also be seen in this figure. Chamber 60 is connected to chamber 64 via diverter valve 78. The passageway that connects these two chambers is inclined, rising sharply before encountering diverter valve 78 and then falling sharply after encountering the valve. The angle of inclination 63 measured from either side of the diverter valve 78 is approximately 30°. In chamber 64, a passageway 65 leading to diverter valve 74 can be seen. Finally in this figure, port 54 can be seen as opening into chamber 64.

IN THE CLAIMS

Please replace claims 9, 11, and 14 with the following claims:

9.(AMENDED) The diverter valve assembly of claim 1, wherein fluid flowing in a first direction enters said valve assembly through said first port, passes through said first chamber, is directed across said first diverter valve into said second chamber, exits said valve assembly through said second port, reenters said valve assembly through said fourth port, passes through said fourth chamber, is directed across said third diverter valve, passes through said third chamber, and exits said valve assembly through said third port.

11.(AMENDED) The diverter valve assembly of claim 1, wherein fluid flowing in a second direction enters said valve assembly through said first port, passes through said first chamber, is directed across said fourth diverter valve into said fourth chamber, exits said valve assembly through said fourth port, reenters said valve assembly through said second port, passes through said second chamber, is directed across said second diverter valve, passes through said third chamber, and exits said valve assembly through said third port.

14.(AMENDED) The diverter valve assembly of claim 13, wherein said first diverter valve operates to prevent fluid communication between said first and said second chamber, said second diverter valve operates to prevent fluid communication between said third and said second chamber, said fourth diverter valve operates to prevent fluid communication between said third and said fourth chamber, and said fourth diverter valve operates to prevent fluid communication between said first and said fourth chamber.

STATUS OF THE CLAIMS

Claims 1-16 are pending. Claims 9, 11 and 14 have been amended.

REMARKS

Pursuant to 37 CFR § 1.121, the above amendments are marked on separate sheets entitled "VERSION WITH MARKINGS TO SHOW CHANGES MADE" following these remarks.

The specification in column 1, line 63 has been amended by replacing the erroneous recitation of "valve 12a" with -- valve 12b -- . Support for this amendment can be found in FIG. 1C which shows fluid (depicted by the bolded arrow) entering the valve assembly 10 through valve 16a and exiting the valve assembly 10 through valve 12b. Hence, no new matter is believed entered by this amendment.

The specification in column 3, line 21 has been amended by replacing the erroneous recitation of "A-A" with -- 3B-3B --. Support for this amendment can be found in FIG. 3A which shows only the section line 3B-3B. Hence, no new matter is believed entered by this amendment.

The specification in column 4, lines 16-19 has been amended by replacing the erroneous recitation "Fluid entering any of the ports encounters a chamber and channels leading to three diverter valves." with -- Fluid entering any of the ports encounters a chamber and channels leading to *at least two* diverter valves. *Fluid entering port 52, for example, encounters chamber 62 and channels leading to diverter valves 70 and 72.* -- Support for this amendment can be found in FIG. 3A. Hence, no new matter is believed entered by this amendment.

The specification in column 4, line 30 has been amended by replacing the erroneous

recitation of "A-A" with -- 3B-3B --. Support for this amendment can be found in FIG. 3A which shows only the section line 3B-3B. Hence, no new matter is believed entered by this amendment.

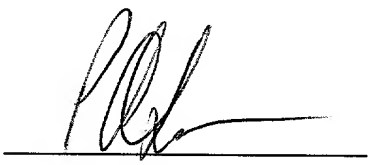
Claims 9 and 11 have been amended to correct typographical/spelling errors. In particular, the term "exists" recited in claims 9 and 11 has been replaced with the term -- exits -- . Support for these amendments can be found in column 4, lines 19-59. Hence, no new matter is believed entered by this amendment.

Claim 14 has been amended to correct indefiniteness in the recitation of "between third and said second chamber." In particular, the definite article "said" was inadvertently omitted between the terms "between" and "third" in this recitation. Since the "third chamber" element is positively recited for the first time in claim 1, from which claim 14 indirectly depends, the definite article "said" should have been recited between the terms "between" and "third" in claim 14 to refer back to the "third chamber." No new matter is believed entered by this amendment.

It is respectfully submitted that claims 1-16 are in condition for allowance, early notification of which is earnestly solicited. Should there be any questions or other matters whose resolution may be advanced by a telephone call, the Examiner is cordially invited to contact Applicant's undersigned attorney at his number listed below.

No fee is believed due as a result of this communication. The Commissioner, however, is hereby authorized to charge any other fees which may be required or credit any overpayment to Deposit Account No. 04-1679.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

The following marked-up specification and claims correspond to the replacement specification and claims of this amendment.

Last paragraph starting at line 46 of column 1:

Fluid can flow through the prior art valve assembly 10 depicted in FIG. 1A in any one of the three directions depicted in FIGS. 1B-1D. The fluid flow is represented by arrows 25 in these figures. In FIG. 1B, which represents the forward product flow through the column, valve 14*a* is opened allowing the fluid to flow from the process piping into the valve assembly 10. Valve 16*a* is also opened allowing the fluid to flow into the chromatography column (not shown). The fluid returns from the chromatography column passing through valve 16*b* and reentering the valve assembly. The fluid leaves the valve assembly passing through valve 14*b* on its path back to the process piping. Valves 12*a* and 12*b* remain closed during this process. According to the reverse process flow depicted in FIG. 1C, fluid entering the valve assembly 10 from the process piping can flow through valves 12*a* and 16*b* into the column, returning from the column through valve 16*a*, and exiting the valve assembly through valve [12*a*] <u>12*b*</u> back through the process piping. Valves 14*a* and 14*b* remain closed during this process. The column may be bypassed altogether according to the process flow depicted in FIG. 1D, where the liquid entering into the valve assembly from the process piping encounters opened valves 12*a*, 14*a*, 12*b* and 14*b*, exiting the valve assembly without entering the chromatography column which remains inaccessible by closing valves 16*a* and 16*b*.

The fifth full paragraph of column 3 starting at line 20:

FIG. 3B is an enlarged cross-sectional view through line [A–A] 3B-3B of FIG. 3A;

The first full paragraph of column 4 starting at line 6:

Referring now to FIG. 3A, there is shown a top view of the valve assembly, minus the manual bonnets and with a partial cross-sectional view of the underlying channel network drawn in with broken lines. As can be seen in this figure, ports 50, 52, 54 and 56 are arranged at angles of approximately 90° with respect to each other on opposing ends of the octagonal base section of the valve assembly. Each port opens into a chamber in the valve assembly 30–port 50 opening into chamber 60, port 52 opening into chamber 62, port 54 opening into chamber 64, and port 56 opening into chamber 66. Fluid entering any of the ports encounters a chamber and channels leading to [three] at least two diverter valves. Fluid entering port 52, for example, encounters chamber 62 and channels leading to diverter valves 70 and 72. Fluid entering port 50, for example, encounters chamber 60 and channels leading to diverter valves 70, 76 and 78. The smooth and tortuous network of passageways that lead through the valve assembly connect the ports with the chambers and valves in a such a way that the valve assembly is fully drainable as will be later explained. The flow of the fluid is controlled by the diverter valves 70, 72, 74, 76, 78 and may be adjusted to permit specific flow directions which, in combination with the smooth and tortuous passageways, eliminate dead-legs from the system.

The second full paragraph of column 4 starting at line 28:

Referring now to FIG. 3B, there is shown an enlarged cross-sectional view of the valve

assembly through line [A-A] 3B-3B of FIG. 3A. As can be seen in the figure, port 50 opens into chamber 60. A passageway 55 leading to diverter valve 76 can also be seen in this figure. Chamber 60 is connected to chamber 64 via diverter valve 78. The passageway that connects these two chambers is inclined, rising sharply before encountering diverter valve 78 and then falling sharply after encountering the valve. The angle of inclination 63 measured from either side of the diverter valve 78 is approximately 30°. In chamber 64, a passageway 65 leading to diverter valve 74 can be seen. Finally in this figure, port 54 can be seen as opening into chamber 64.

9.(AMENDED) The diverter valve assembly of claim 1, wherein fluid flowing in a first direction enters said valve assembly through said first port, passes through said first chamber, is directed across said first diverter valve into said second chamber, exits said valve assembly through said second port, reenters said valve assembly through said fourth port, passes through said fourth chamber, is directed across said third diverter valve, passes through said third chamber, and [exists] exits said valve assembly through said third port.

11.(AMENDED) The diverter valve assembly of claim 1, wherein fluid flowing in a second direction enters said valve assembly through said first port, passes through said first chamber, is directed across said fourth diverter valve into said fourth chamber, exits said valve assembly through said fourth port, reenters said valve assembly through said second port, passes through said second chamber, is directed across said second diverter valve, passes through said third chamber, and [exists] exits said valve assembly through said third port.

14.(AMENDED) The diverter valve assembly of claim 13, wherein said first diverter valve operates to prevent fluid communication between said first and said second chamber, said second diverter valve operates to prevent fluid communication between said third and said second chamber, said fourth diverter valve operates to prevent fluid communication between said third and said fourth chamber, and said fourth diverter valve operates to prevent fluid communication between said first and said fourth chamber.